

REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow.

No claims are amended.

A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 1-13 are now pending in this application.

Rejections under 35 U.S.C. § 103

Claims 1, 2 and 5-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 1,174,600 A2 to Kobayashi et al. ("Kobayashi"). Claims 3 and 4 stand rejected under § 103(a) as being unpatentable over Kobayashi in view of certain legal precedent. Applicants respectfully traverse these rejections for at least the following reasons.

Claim 1 is directed to a purification device for an exhaust gas of a diesel engine. The purification device of claim 1 includes both a catalyst which traps nitrogen oxides, and a filter which traps particulate matter. Sulfur oxide poisoning of the catalyst is eliminated by contact with an exhaust gas corresponding to a rich air-fuel ratio, while the filter burns trapped particulate matter by contact with an exhaust gas corresponding to a lean air-fuel ratio. The device is configured to perform lean air-fuel ratio operation of the diesel engine when a trapped amount of particulate matter in the filter becomes sufficiently large, even when the engine is operated with a rich air-fuel ratio for the purpose of eliminating sulfur oxide poisoning of the catalyst. Once the particulate matter is reduced sufficiently, rich air-fuel ratio operation is resumed. In this regard the device of claim 1 includes a programmable controller programmed to "control the mechanism to cause the exhaust gas composition to be in a state corresponding to the lean air-fuel ratio, when the particulate matter trap amount has reached the predetermined amount during a period when the exhaust gas composition is in a state corresponding to the rich air-fuel ratio" and "control the mechanism to cause the exhaust

gas composition to be in a state corresponding to the rich air-fuel ratio, when the particulate matter trap amount has reached the predetermined decrease state during the period when the exhaust gas composition is in the state corresponding to the lean air-fuel ratio.” Kobayashi does not suggest controlling an air-fuel ratio mechanism to be in a lean air-fuel state when a particulate matter trap amount reaches a predetermined amount during the time the air-fuel ratio is rich, such as during sulfur oxide poisoning elimination, and then, when the particulate matter trap amount reaches a decreased state, controlling the air-fuel ratio to be rich again, such as to resume sulfur oxide poisoning elimination.

Kobayashi merely discloses performing sulfur oxide poisoning elimination of a NOx catalyst after regeneration of a particulate filter has been completed. Thus, even if the sulfur oxide poisoning elimination operation of Kobayashi included rich operation, this rich operation is performed only after the particulate filter regeneration has been completed. Kobayashi does not disclose ceasing rich air-fuel ratio operation of the engine, such as when a sulfur oxide poisoning elimination operation is performed, when the trapped amount of particulate matter has reached a predetermined amount and then starting lean operation, followed by resuming rich operation once the trapped amount falls to a decreased state.

Moreover, Kobayashi does not realize the benefits of the present invention of claim 1, where sulfur oxide poisoning of a catalyst can be prevented, while at the same time trapped particulate matter is prevented from reaching too high a level. In the present invention of claim 1, this advantage is achieved by interrupting rich state operation, where a sulfur oxide poisoning elimination operation is performed, to start the particulate matter reduction operation in the lean state, and then only after the particulate matter is sufficiently reduced, resuming rich state operation. By applying such air-fuel ratio control, elimination of the sulfur oxide poisoning of a catalyst is performed without risking an excessive amount of trapped particulate matter. Kobayashi merely discloses performing sulfur oxide poisoning elimination of a NOx catalyst after regeneration of a particulate filter has been completed, and fails to suggest the advantage of the present invention of claim 1.

Independent claim 12 recites “means for controlling the mechanism to cause the exhaust gas composition to be in a state corresponding to the lean air-fuel ratio, when the particulate

matter trap amount has reached the predetermined amount during a period when the exhaust gas composition is in a state corresponding to the rich air-fuel ratio” and “means for controlling the mechanism to cause the exhaust gas composition to be in a state corresponding to the rich air-fuel ratio, when the particulate matter trap amount has reached the predetermined decrease state during the period when the exhaust gas composition is in the state corresponding to the lean air-fuel ratio”. Thus, claim 12 is patentable over Kobayashi for reasons analogous to claim 1.

Independent claim 13 recites “controlling the mechanism to cause the exhaust gas composition to be in a state corresponding to the lean air-fuel ratio, when the particulate matter trap amount has reached the predetermined amount during a period when the exhaust gas composition is in a state corresponding to the rich air-fuel ratio” and “controlling the mechanism to cause the exhaust gas composition to be in a state corresponding to the rich air-fuel ratio, when the particulate matter trap amount has reached the predetermined decrease state during the period when the exhaust gas composition is in the state corresponding to the lean air-fuel ratio”. Thus claim 13 likewise is patentable over Kobayashi for reasons analogous to claim 1.

The dependent claims ultimately depend from claim 1, and are patentable for at least the same reasons, independently of further patentable features recited therein.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to

papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R.
§1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date February 1, 2005

By Thomas G. Bilodeau

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5414
Facsimile: (202) 672-5399

Richard L. Schwaab
Attorney for Applicant
Registration No. 25,479

Thomas G. Bilodeau
Attorney for Applicant
Registration No. 43,438